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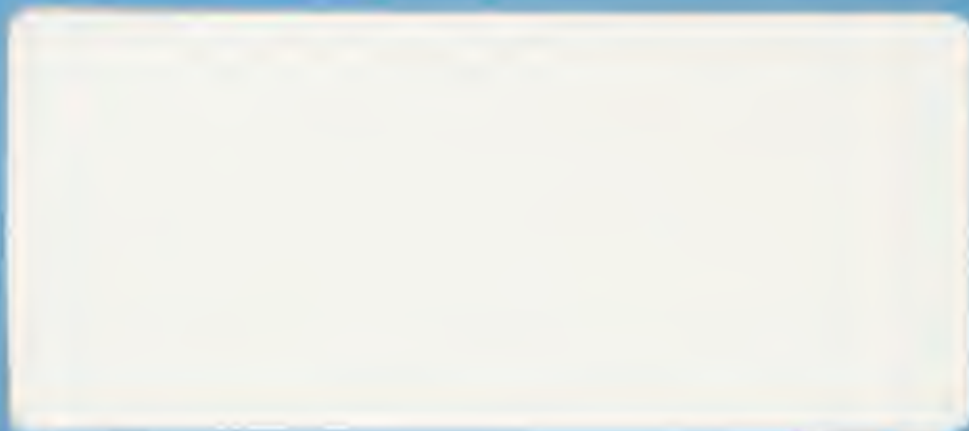


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CONSULTING ENGINEERS & SURVEYORS
HELENA — GREAT FALLS — GLENDIVE

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FINAL REPORT
FAIRVIEW PHASE 4 MINE PROJECT
FAIRVIEW, MONTANA
MT A/E 86-46-119

MAY, 1987

Prepared for: MR. RICHARD JUNTUNEN, CHIEF
Abandoned Mine Reclamation
Bureau
Department of State Lands
1625 11th Avenue
Helena, MT 59620

Prepared by: L.C. HANSON COMPANY
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L. C. HANSON COMPANY
CONSULTING ENGINEERS & SURVEYORS
HELENA — GREAT FALLS — GLENDIVE



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FINAL REPORT

FAIRVIEW PHASE 4 MINE PROJECT

I. INTRODUCTION

A. Project Objectives

The two main objectives of this project were to (1) reclaim and restore surface disturbance and (2) explore and alleviate the hazards to public facilities affected by the subsurface conditions created by abandoned underground coal mines.

B. History

The FAIRVIEW PHASE 4 project consisted of four separate mining operations.

The Jennison operation began in the early 1900's and continued until the 1940's. The mine was a large commercial operation which grew from a small slope mine into a two-level mine with commercial shipping of coal by railroad to as far as Minnesota. The mine also had a brick factory and a coal-fired generation plant which furnished electricity to the surrounding communities of Sidney and Williston. The decline in the use of coal, the difficulties of dewatering the lower level and the sale of the generation plant brought the entire mine to a permanent shutdown by the late 1940's.

The Gardner, Russell and LeMieux mines were small family-owned operations that also began in the early 1900's. These mines each had several different operators throughout the mining era but eventually the decline in coal demand and the competition from the Jennison mine forced the sporadic mining to a halt by the late 1930's in all three of these smaller mines.

C. Project Location

The FAIRVIEW PHASE 4 mine reclamation project is located within and adjacent to the city limits of Fairview, Montana in Sections 7, 8 and 18, T24N, R60E, Richland County.

D. Site Description and Problems

Most of the area affected by the mining is used for agricultural grazing; however, portions of the mine are within the city limits of Fairview and potentially affect homesites, a major irrigation canal, public utilities and a state highway. The entire area of over 40 acres contains open shafts, large subsided areas, scattered garbage and debris, hazardous concrete structures and waste piles. The proximity of the mine to the city created an especially dangerous attractive nuisance to the many children who used the area for recreation. The undermining of the canal, highway and power lines posed a safety threat to the unaware public.

II. DESCRIPTION OF PROJECT RECLAMATION

A. Project Planning

The planning for this project was similar to other reclamation projects completed by L.C. Hanson Co. and the Montana Department of State Lands. Local borrow was available and of the soil type to allow closure of the shafts and regrading/backfilling of the subsided areas. The structures, debris and waste piles were disposed of off site or buried on site. The subsurface reclamation work beneath the canal and highway was performed by a systematic process of exploration followed by pressure grout stabilization of critical areas. Reclamation planning was the result of data gathered through aerial photography, landowner interviews, site visits, historical and courthouse records, and research data.

B. Chronological History

On September 26, 1986 a pre-bid meeting was held on site for all interested bidders and parties. Bids were opened on October 15 and SHUMAKER TRUCKING AND EXCAVATING of Great Falls, Montana was awarded the general Contract on October 16. The Agreement was signed on October 30 but the Notice to Proceed was not issued until February 24, 1987 at the request of the Contractor. Work began on February 24.

The project was substantially completed on May 12 and a final inspection was held on May 28, 1987 to accept the project as complete.

C. Equipment Used

The salvaging and replacing of topsoil, grading and backfilling of subsided areas, bank caving and debris/structure removal and burial were performed with the following equipment:

Caterpillar 966 front-end loader w/4 C.Y. bucket and ripper
Waldon 5000 front-end loader w/1/2 C.Y. bucket
Caterpillar D8H dozer w/ripper
Ford tandem truck w/dump box and 1800 gallon water tank
Case 680C tractor-mounted backhoe

Subsurface exploration and stabilization were completed with the following equipment:

Gardner-Denver air-rotary drilling rig
International tandem watertruck w/3000 gal tank
Case P-50 "Hydra-placer" w/60' boom
P&H cherry picker crane w/60' boom
Four (4) trucks - concrete mixer trucks w/8 C.Y. capacity

Revegetation was completed with the following machinery:

Oliver 1800 tractor
John Deere 6' disc w/harrow
Bowie 6' crimp disc
John Deere 6' custom grass drill
Home built mulcher
Caterpillar D2 crawler
John Deere 4040 tractor

D. Construction Operations

The construction project was divided into two schedules. Schedule I included all the surface reclamation associated with the problems existing on the surface. Schedule II consisted of the exploration and reclamation work required to stabilize the subsurface problems and any surface reclamation required as a result of the subsurface work.

Some operations took place concurrently between Schedules I and II, but the following items of work were performed in the order as listed.

SCHEDULE I

Debris over the entire site was gathered by hand and hand tools into collections piles and then the 2 front-end loaders worked together to load the piles into the dump truck. The debris was then buried in a disposal pit adjacent to the construction limits.

The concrete structures required blasting and heavy equipment demolition to break up into pieces small enough to load and dispose of off site. The 966 front-end loader, the D8H dozer and the dump truck were required to perform this work.

One of two large circulation fans from the Jennison mine was removed from the site and relocated in the Fairview City Park on a concrete display base enclosed by a chain link fence. The display base was

prepared and the crane removed, transported and placed the fan on the anchor bolts of the base.

Topsoil from subsidence was salvaged with the tractor-mounted backhoe, the 966 front-end loader and the Waldon loader. The D8H dozer stripped topsoil from the flatter grading areas and consolidated the smaller topsoil piles into several large piles out of the way from future work areas.

Airshafts on the project were backfilled with suitable material using the backhoe and 966 loader.

The tractor-mounted backhoe performed the Bank Caving item on overhanging or bell-shaped subsidence to insure complete exposure of all unstable areas for proper backfilling access.

The designated borrow areas and waste piles provided the material for Subsidence Backfill. The dozer pushed up backfill piles and the dump truck hauled to the farther pits while the 966 loader hauled to the closer pits. The abundance of moisture in the ground eliminated the need for providing compaction water and the loaded truck and 966 loader were used for wheel-rolling compaction.

The D8H dozer moved the material for the Subsidence Grading item and the 966 loader provided the compaction by spreading and wheel rolling. Nearly all of the trees existing prior to the construction project were left intact throughout the entire grading and backfilling operation even though the Contractor had to take special efforts to preserve them.

The D8H dozer uniformly distributed the topsoil piles over the entire disturbed area. The two front-end loaders assisted in small areas and around trees or shrubs.

The lumpy and crusted seedbed, created by the rain received during construction, was prepared by the disc and harrows. The special grass drill was capable of placing both the fertilizer and grass seed at different seedbed levels in one operation. The straw mulch was distributed over the seedbed area by a combination of a blower and spreader attachment. The mulch was then tucked or crimped by the crimping disc or tracked with the D2 dozer on the steep slopes.

Farm Fence was constructed to enclose and protect new vegetation which lies within the livestock grazing areas.

SCHEDULE II

The subsurface reclamation consisted of 3 construction areas. Two of the areas were located on Montana Highway 201 and the third area was on the Main Canal of the Lower Yellowstone Irrigation Project.

Exploration drilling of 4-3/4" borehole extended to the bottom of the second level of the mined coal seam in each of the three construction areas.

Exploration drilling in Areas #1 and #2 (Montana Highway #201) did encounter mine workings and/or unstable overburden as a result of mine collapse. The borehole locations were selected on a grid pattern that extended to the right-of-way limits on either side of the roadway. Traffic control signing and flagmen were required for drilling on the roadway. Access ramps on roads were built for some of the boreholes located off of the roadway. Boreholes encountering collapsed material were reamed to 10" diameter for pressure grouting.

The exploration drilling in Construction Area #2 (Main Canal) did not encounter any mine workings or any unstable strata above the coal. Subsurface stablization in Area #3 was not required and each of the boreholes were backfilled with concrete grout for the full length.

All exploration drilling and production reaming were performed by the Gardner-Denver drilling rig. The water truck was used on some boreholes for injection of water as required by the certain formations encountered. A drilling "soap" was also injected with the water in instances to facilitate the drilling process.

After the drilling defined the limits and areas of collapse, the pressure grouting sequence was established. 3" steel injection pipe was placed in each reamed borehole to the pre-determined depth desired for pumping. Necessary fittings and piping were then installed from the top of the injection pipe to the grout pump. The grout pump was located on the roadway or on the access trails but in a location which would allow the mixer trucks to easily unload into the grout pump hopper. The crane was used to place and remove injection pipe to the desired level. The grout pump forced grout into the unconsolidated formation to create a stabilization column or footing. Any borehole not filled to the surface by the pressure grout injection was backfilled for the full length with grout placed by gravity.

All surface disturbance caused by the construction of access trails or the grout injection process was revegetated by the same equipment and methods used under Schedule I.

III. COST SUMMARY

A. Final Payment Request and Reconciliation Change Order

A copy of the Final Payment Request and Reconciliation Change Order are contained in Appendix A. These documents contain the final quantities and costs for each work item.

B. Change Orders

Change Order No. 1

Item #1 - The discovery of an additional concrete basement was made while performing Structure Removal. The structure posed a hazard and was directly mine related. The additional work was completed at equipment rental rates as outlined in the Proposal.

Item #2 - The Contractor requested permission to excavate an on-site pit for debris burial. The Landowner agreed to allow on-site burial to reduce haul road damage. The Contractor agreed to a decrease in Contract price because of a direct savings of the dumping fee at the off-site disposal pit.

Change Order No. 2

Item #1 - Additional fissures and subsidence developed within the construction limits between the pre-bid and pre-construction meetings. The extra work was completed by the same methods used throughout the project and paid for by equipment rental rates and Contract bid prices as outlined in the Proposal.

Item #2 - The Owner requested the removal and burial of ash/trash piles not supporting desirable vegetation. Most of the piles were small and within the debris cleanup areas. The work was performed at equipment rental rates.

Change Order No. 3

Item #1 - The Landowner requested prior to the preconstruction meeting that Subsidence Grading be changed to Subsidence Backfill on his property. The Contractor justified his increase in costs due to the additional hauling and performed the work by the same methods used throughout the project.

Item #2 - The access approach from the existing roadway to the office trailer and equipment storage area deteriorated to a nearly-impassable roadway because of heavy usage. The Landowner expressed concern about

the rehabilitation and it was decided to resurface the approach with gravel.

Item #3 - Reconciliation of Final Quantities.

C. Costs Per Site/Unit

COST SUMMARY
Schedule I

ITEM	TOTAL COST	UNITS	COST/UNIT
MOBILIZATION	20,757.00	Site	\$20,757.00/Site
DEBRIS CLEANUP	1,437.25	Site	\$ 1,437.25/Site
SALVAGE FAN NO. 2	1,079.00	1 Each	\$ 1,079.00/Each
REMOVAL OF STRUCTURES	1,365.00	Site	\$ 1,365.00/Site
SALVAGE AND REPLACE TOPSOIL	17,301.40	5966 C.Y.	\$ 2.90/C.Y.
CLOSE MINE OPENING - SHAFT	2,280.00	2 Each	\$ 1,140.00/Each
BANK CAVING	487.50	3.25 Hour	\$ 150.00/Hour
SUBSIDENCE BACKFILL	18,863.85	4,775.66	\$ 3.95/C.Y.
SUBSIDENCE GRADING	14,515.25	5.4 Acres	\$ 2,688.01/Acre
WASTE PILE DISPOSAL	2,180.00	545 C.Y.	\$ 4.00/C.Y.
PROVIDE WATER	45.00	3.0 MGal	\$ 15.00/MGal
REVEGETATION	15,442.98	11.1 Acre	\$ 1,391.26/Acre
FARM FENCE *	8,031.00	5631 L.F.	\$ 1.43/L.F.

* Includes gates, double panels, single panels, and deadmen.

COST SUMMARY

Schedule II

ITEM	TOTAL COST	UNITS	COST/UNIT
TRAFFIC CONTROL	7,529.76	162 Hours	\$ 46.48/Hour
BOREHOLE DRILLING (4-3/4" DIAMETER)	33,924.60	14,436.0 L.F.	\$ 2.35/L.F.
BOREHOLE REAMING (8" DIAMETER)	10,825.08	3682 L.F.	\$ 2.94/L.F.
PRESSURE GROUT INJECTION-SETUP	12,880.00	28 Each	\$ 460.00/Each
PRESSURE GROUT INJECTION-GROUT	92,397.60	1252 C.Y.	\$ 73.80/C.Y.
GRAVITY GROUT INJECTION-GROUT	1,696.00	26.5 C.Y.	\$ 64.00/C.Y.
BACKFILL BOREHOLE NOT INTO VOID	13,475.00	77.0 Each	\$ 175.00/Each
REVEGETATION	834.42	.6 Acres	\$1,390.70/Acre

IV. SUMMARY

A. Completed Reclamation

The reclamation was completed 31% over the Contract bid price but 13% under the Contract time. The total cost of the project was \$277,347.69. Total time used was 78 calendar days.

B. Comments

Shumaker Trucking and Excavating completed all the work with full cooperation and to a high level of workmanship. The project moved smoothly throughout the construction phase even when several different operations were concurrently performed at different locations.

The Contractor made a special effort to preserve the existing trees within Subsidence Grading areas and Subsidence Backfill areas. The Landowner was especially pleased with the appearance of the finished product. Although the tree preservation effort took a little extra time and money, the benefit of a pleased Landowner and established vegetation is worth the investment.

Future monitoring of the site should be made to note any further subsidence or settling. The revegetation was completed just prior to several spring rains so conditions were very favorable for growth.

V. SLIDES

The Slide Logs are contained in Appendix B.

APPENDIX A

Payment Request No. 3
Final

From: April 24, 1987

To: May 24, 1987

Project Name: Fairview Phase 4

Location: Richland Co.

Project No.: Mont A/E 86-46-119

Name Of Contractor: Shumaker Trucking

Address: PO Box 1442 Great Falls Mt.
59403

Summary Of Project Status

Amount of Original Contract	\$211,645.40
Amount of Approved Change Order(s)	65,702.29
TOTAL CONTRACT AMOUNT	277,347.69
Contract Time Used to Date	78 Days
Percentage of Contract Time Used	87%
Percentage of Contract Amount Earned	100%

Original Contract Amount Completed	211,645.40
Change Order(s) Amount Completed	65,702.29
Amount for Materials On Site	0.00
TOTAL To Date	277,347.69
Times 90% =	No Retainage
TOTAL AMOUNT Earned To Date	277,347.69
Less Previous Amount Earned	242,963.90
Amount Payable This Period	34,383.79
Less 1% Gross Receipts Tax	343.84
TOTAL DUE CONTRACTOR THIS PERIOD	\$34,039.95

RECEIVED

JUN 12 1987

LOWELL C. HANSON CO.

Requested By: Shumaker Trucking *Edna Shumaker* Date: 6-6-87
(Contractor)

Checked By: L.C. Hanson Co. *Allan W. Hanson* Date: 6-10-87
(Engineer)

Approved By: Department of State Lands *Richard J. Hunter* Date: 6/11/87
Abandoned Mine Reclamation Bureau (Owner)

PAY REQUEST NO. 3

L.C. Hanson Co.

PROJECT: Fairview Ph 4 - Schedule I

MONT A/E 86-46-119

Page 2 Of 6

ITEMIZATION OF QUANTITIES AND COSTS

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
1	Mobilization	1.0 L.S.	20730.00	0.00	1.00	20730.00	100%
2	Debris Cleanup	1.0 L.S.	816.00	0.05	1.00	816.00	100%
3	Salvage Fan No. 2	1.0 L.S.	1079.00	0.00	1.00	1079.00	100%
4	Removal of Structures	1.0 L.S.	760.00	0.00	1.00	760.00	100%
5	Salvage & Replace Topsoil	5027.0 C.Y.	2.90	79.00	5966.00	17301.40	100%
6	Close Mine Openings-Shaft	2.0 Ea.	1140.00	0.00	2.00	2280.00	100%
7	Bank Caving	4.0 Hrs.	150.00	0.00	3.25	487.50	100%
8	Subsidence Backfill	4460.0 C.Y.	3.95	0.00	4263.00	16838.95	100%
9	Subsidence Grading	1.0 L.S.	13899.00	0.00	1.00	13899.00	100%
10	Waste Pile Disposal	545.0 C.Y.	4.00	0.00	545.00	2180.00	100%
11	Provide Water	193.8 MGal.	15.00	3.00	3.00	45.00	100%
12	Fertilizer	383.0 lb.	0.90	130.60	1033.70	930.33	100%
13	Seed	100.0 lb.	16.50	38.40	274.10	4522.65	100%
14	Vegetative Mulch	12420.0 lb.	0.30	4200.00	33300.00	9990.00	100%
15	F-3M Farm Fence	4335.0 L.F.	1.00	0.00	5631.00	5631.00	100%
16	Gate	16.0 L.F.	5.00	0.00	32.00	160.00	100%
	Sub-Total					97650.73	

* Work completed on this item

L.C. Hanson Co.

Page 4 Of 6

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
1	Traffic Control	120.0 Hrs.	46.48	6.25	162.00	7529.76	100%
2	B.H. Drilling, 4-3/4" Dia	9710.0 L.F.	2.35	484.00	14436.00	33924.60	100%
3	Borehole Reaming, 8" Dia.	1740.0 L.F.	2.94	0.00	3682.00	10825.08	100%
4	Casing Pipe, 8" I.D.	250.0 L.F.	5.36	0.00	0.00	0.00	100%
5	Pres. Grout Inject, Setup	13.0 Ea.	460.00	0.00	28.00	12880.00	100%
6	Pres. Grout Inject, Grout	750.0 C.Y.	73.80	0.00	1252.00	92397.60	100%
7	Grav. Grout Inject, Setup	2.0 Ea.	380.00	0.00	0.00	0.00	100%
8	Grav. Grout Inject, Grout	195.0 C.Y.	64.00	2.00	26.50	1696.00	100%

Work completed on this item

PAY REQUEST NO. 3

L.C. Hanson Co.

PROJECT: Fairview Ph 4 - Change Orders

MONT A/E 86-46-119

Page 5 Of 6

ITEMIZATION OF QUANTITIES AND COSTS

ITEM NO.	DESCRIPTION	ESTIMATED PLAN QUANTITY	UNIT BID PRICE	UNITS OF WORK COMPLETED THIS REQUEST	UNITS OF WORK COMPLETED TO DATE	TOTAL COST OF COMPLETED WORK	% OF EST. QUANT. COMP.
	Change Order 1						
	a. Structure Removal	5.5 Hrs.	110.00	0.00	5.50	605.00	100%
	b. On-site Debris Burial	1.0 L.S.	-250.00	0.00	1.00	-250.00	100%
	Pit						
	Change Order 2						
	a. Subsidence Grading	7.3 Hrs.	85.00	0.00	7.25	616.25	100%
	b. Removal of Ash/Trash	4.3 Hrs.	85.00	6.00	10.25	871.25	100%
	piles						
	Change Order 3						
	a. Substitute Subsidence	15.0 Hrs.	85.00	15.00	15.00	1275.00	100%
	Backfill in place of	15.0 Hrs.	50.00	15.00	15.00	750.00	100%
	Subsidence Grading for						
	one large subsidence on						
	R. Johnson's property						
	CAT 966 Loader & Dump Trk.						
	Subtotal this page					3867.50	

* Work completed on this item

SECTION II

2.12 CHANGE ORDER

Order No. 3Date: June 5, 1987Agreement Date: October 30, 1986NAME OF PROJECT: FAIRVIEW, PHASE 4MT A/E 86-46-119OWNER: Montana Department of State Lands - AMR BureauCONTRACTOR: Shumaker Trucking and Excavating - Great Falls, MT

Change Orders must be accompanied by an itemized cost breakdown. You are hereby requested to comply with the following changes from the Contract Documents. (Show separate costs for materials, labor, equipment and miscellaneous. Show percent where applicable.)

ITEM NO.	DESCRIPTION OF CHANGES - ESTIMATED QUANTITIES & UNITS	COST OF CHANGES					TOTAL COST
		MAT'LS	LABOR	EQUIP.	MISC.	TOTAL UNIT COST	
1.	<u>SUBSIDENCE BACKFILL</u> Substitute Subsidence Backfill in place of Subsidence Grading for one large sub. on R. Johnson's property (Cat 966 Loader & Dump Truck)	\$15/Hr \$15/Hr				\$35/Hr \$50/Hr	\$ 1,275.00 750.00
2.	<u>PROVIDE AND PLACE GRAVEL</u> Repair access approach to condition of adjacent roadway	9 C.Y.				\$ 3/C.Y.	27.00
3.	<u>RECONCILIATION OF FINAL QUANTITIES</u> (See Attached Sheets)						\$62,317.79
TOTAL COST - MAT'LS, LABOR, EQUIPMENT & MISC.					\$ 64,369.79		
OVERHEAD & PROFIT @ <u>N/A</u> %					-0-		
GRAND TOTAL - THIS CHANGE ORDER					\$ 64,369.79		

Original Contract Price	\$ 211,645.40
Current Contract Price Adjusted by Previous Change Order	212,977.90
Cost This Change Order (+ or -)	+ 64,369.79
New Contract Price Including This Change Order	\$ 277,347.69

The completion date as set forth in the Contract Documents shall be (unchanged, increased, decreased) by -0- calendar days.

The date for completion of all work will be May 26, 1987.

Description and Justification for Change:

1. ITEM 1. Description: Substitute Subsidence Backfill for Subsidence Grading on the JENNISON MINE for the 1 subsidence on R. Johnson's property. The borrow source for the backfill material is R. Johnson's developed gravel pit about 1/2 mile west of the subsidence area.

Justification: Landowner requested and received approval for this change prior to the preconstruction meeting.

ITEM 2. Description: Repair access approach from existing roadway to the office trailer. Fill in depression at the gate with gravel and grade to blend at the match points.

Justification: Normal travel and use of the access road deteriorated the trail to an unsightly, unvegetated area. The Landowner requested the trail be upgraded to a usable access road even during wet conditions.

ITEM 3. Description: Reconciliation of actual quantities to estimated quantities and because of varying field conditions.

Justification:

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JUN 10 1987

SURETY CONSENT

LOWELL C. HANSON CO.

The surety hereby consents to the aforementioned Contract Change Order and agrees that its bond or bonds shall apply and extend to the Contract as thereby modified or amended per this Change Order. The principal and the Surety further agree that on or after execution of this consent, the penalty of the applicable Performance Bond or Bonds is hereby increased by SIXTY FOUR THOUSAND THREE HUNDRED SIXTY NINE AND 79/100

(\$ 64,369.79-----) (One hundred percent (100%) of the Change Order amount) and the penalty of the applicable Payment Bond or Bonds is hereby increased by SIXTY FOUR THOUSAND THREE HUNDRED SIXTY NINE AND 79/100-----(\$ 64,369.79-----)

(One hundred percent (100%) of the Change Order amount).

COUNTERSIGNED BY MONTANA RESIDENT AGENT

COGSWELL AGENCY

SURETY

FIREMAN;S FUND INSURANCE COMPANY

BY: [Signature]
(Seal)

Recommended by: L. C. Hanson Company Alan W. [Signature], Engineer 6/5/87
Accepted by: [Signature], Contractor 6-6-87
Approved by: [Signature], Owner 6/11/87

Change Order No. 3
FAIRVIEW, PHASE 4
MT A/E 86-46-119

RECONCILIATION OF FINAL QUANTITIES
SCHEDULE I

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	ACTUAL QUANTITY	CHANGE IN PRICE
5.	SALVAGE & REPLACE TOPSOIL	5027 C.Y.	5966 C.Y.	+\$ 2,723.10
7.	BANK CAVING	4 HOURS	3.25 HOURS	- 112.50
8.	SUBSIDENCE BACKFILL	4460 C.Y.	4263 C.Y.	- 778.15
11.	PROVIDE WATER	193.8 MGAL	3.0 MGAL	- 2,862.00
12.	FERTILIZER	383 LBS.	1033.7 LBS.	+ 585.63
13.	SEED	100 LBS.	274.1 LBS.	+ 2,872.65
14.	VEGETATIVE MULCH	12420 LBS.	33300 LBS.	+ 6,264.00
15.	F-3M FARM FENCE	4335 L.F.	5631 L.F.	+ 1,296.00
16.	GATE	16 L.F.	32 L.F.	+ 80.00
17.	DOUBLE PANEL	13 EACH	21 EACH	+ 720.00
18.	SINGLE PANEL	4 EACH	5 EACH	+ 70.00
SUB-TOTAL - SCHEDULE I				+\$ 10,858.73

Change Order No. 3
 FAIRVIEW, PHASE 4
 MT A/E 86-46-119

RECONCILIATION OF FINAL QUANTITIES
SCHEDULE II

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	ACTUAL QUANTITY	CHANGE IN PRICE
1.	TRAFFIC CONTROL	120 HOURS	162 HOURS	+\$ 1,952.16
2.	BOREHOLE DRILLING - 4-3/4" DIAMETER	9710 L.F.	14436 L.F.	+ 11,106.10
3.	BOREHOLE REAMING - 8" DIAMETER	1740 L.F.	3682 L.F.	+ 5,709.48
4.	CASING PIPE, 8" I.D.	250 L.F.	0 L.F.	- 1,340.00
5.	PRESS GROUT INJ-SETUP	13 EACH	28 EACH	+ 6,900.00
6.	PRESS GROUT INJ-GROUT	750 C.Y.	1252 C.Y.	+ 37,047.60
7.	GRAV GROUT INJ-SETUP	2 EACH	0 EACH	- 760.00
8.	GRAV GROUT INJ-GROUT	195 C.Y.	26.5 C.Y.	- 10,784.00
9.	BACKFILL BOREHOLE NOT INTO VOID	59 EACH	77 EACH	+ 3,150.00
10.	BACKFILL BOREHOLE INTO VOID	2 EACH	0 EACH	- 650.00
11.	FERTILIZER	148 LBS.	55.8 LBS.	- 82.98
12.	SEED	39 LBS.	14.8 LBS.	- 399.30
13.	VEGETATIVE MULCH	4800 LBS.	1800 LBS.	- 900.00
	SUB-TOTAL - SCHEDULE II			+\$ 50,949.06
	<u>Change Order No. 2</u>			
b.	REMOVAL OF ASH/TRASH PILES	4.25 HOURS	10.25 HOURS	+ 510.00
	RECONCILIATION TOTAL			<u>+\$ 62,317.79</u>

APPENDIX B

SLIDE LOG

FAIRVIEW PHASE 4

1. Jennison Mine Site prior to construction
2. Subsidence Backfill and
Subsidence Grading Areas Site prior to construction
3. Site prior to construction
4. Site prior to construction
5. Site prior to construction
6. Site prior to construction
7. Site prior to construction
8. Site prior to construction
9. Salvaging topsoil w/backhoe
10. Salvaging topsoil w/backhoe
11. Salvaging topsoil w/front-end loader
12. Salvaging topsoil w/front-end loader
13. Salvaging topsoil w/front-end loader
14. Salvaging topsoil w/front-end loader
15. Salvaging topsoil w/front-end loader
16. Salvaging topsoil-completed subsidence
17. Salvaging topsoil w/D8H dozer
18. Salvaging topsoil w/D8H dozer
19. Salvaging topsoil w/D8H dozer
20. Salvaging topsoil w/D8H dozer
21. Salvaging topsoil w/D8H dozer
22. Salvaging topsoil-topsoil piles
23. Salvaging topsoil-topsoil piles
24. Salvaging topsoil-topsoil piles
25. Salvaging topsoil-topsoil piles
26. Salvaging topsoil-topsoil piles
27. Salvaging topsoil-topsoil piles
28. Salvaging topsoil w/D8H dozer

29. Bank caving w/backhoe
30. Transplanting tree within subsidence grading area
31. Subsidence backfill material stockpile
32. Subsidence backfill-loading into truck
33. Subsidence backfill-wheel rolling for compaction
34. Subsidence backfill-unloading
35. Subsidence backfill-unloading
36. Subsidence backfill-wheel rolling for compaction
37. Subsidence backfill
38. Subsidence grading/fissure sealing
39. Subsidence grading/fissure sealing
40. Subsidence grading/fissure sealing
41. Topsoil spreading
42. Topsoil spreading
43. Topsoil spreading
44. Topsoil spreading
45. Topsoil spreading
46. Topsoil spreading
47. Topsoil spreading complete
48. Topsoil spreading complete
49. Topsoil spreading complete
50. Topsoil spreading complete
51. Topsoil spreading complete
52. Fertilizing, seeding and mulching completed
53. Fertilizing, seeding and mulching completed
54. Fertilizing, seeding and mulching completed
55. Fertilizing, seeding and mulching completed
56. Fertilizing, seeding and mulching completed
57. Fertilizing, seeding and mulching completed
58. Fertilizing, seeding and mulching completed
59. Fertilizing, seeding and mulching completed
60. Fertilizing, seeding and mulching completed
61. Fertilizing, seeding and mulching completed
62. Fertilizing, seeding and mulching completed
63. Fertilizing, seeding and mulching completed.

64.		Fertilizing, seeding and mulching completed
65.		Fertilizing, seeding and mulching completed
66.		Fertilizing, seeding and mulching completed
67.		Vegetative mulch delivered to site
68.		Preparing seedbed-disc w/harrows
69.		Fertilizing and seeding in single operation
70.		Mulching
71.		Mulching
72.		Crimping mulch
73.		Inoculation materials for legume
74.		Crimped mulch
75.	Jennison Mine	Mulch application-Area #1
76.	Revegetation at Explor	Mulch application-Area #2
77.	Areas #1 and #2	Fertilizing, seeding and mulching completed-Area #1
78.		Fertilizing, seeding and mulching completed-Area #1
79.		Fertilizing, seeding and mulching completed-Area #2
80.		Fertilizing, seeding and mulching completed-Area #2
81.	Jennison Mine-Debris Cleanup Area	Site prior to construction
82.		Site prior to construction
83.		Site prior to construction
84.		Site prior to construction
85.		Debris gathered in small piles
86.		Debris gathered in small piles
87.		Debris gathered in small piles
88.		Debris cleanup work-hand work
89.		Debris cleanup work and equipment
90.		Debris cleanup work
91.		Debris cleanup work
92.		Debris cleanup work
93.		Debris burial pit excavatio
94.		Debris burial pit excavation
95.		Debris burial pit excavation
96.		Debris burial pit excavation
97.		Debris cleanup work-equipment

98.		Debris cleanup work-equipment
99.		Debris cleanup work-equipment
100.		Debris cleanup work-equipment
101.		Dumping debris into burial pit
102.		Dumping debris into burial pit
103.		Compacting debris in burial pit
104.	Jennison Mine-Debris Cleanup Area	Debris cleanup work
105.		Debris cleanup work
106.		Debris cleanup work
107.		Debris cleanup work
108.		Covering debris burial pit
109.		Covering debris burial pit
110.		Covering debris burial pit
111.		Preparing to fertilize and seed
112.		Applying mulch
113.		Applying mulch
114.		Crimping disc
115.		Burial pit revegetated
116.	Jennison Mine-Salvage Fan No. 2	Preparing display base in park
117.		Preparing display base in park
118.		Steel 6"x6" mesh for reinforcing base
119.		Completed display base with imbedded bolts
120.		Unfastening fan from old base
121.		Removing fan from old base
122.		Loading fan on trailer for transporting to park
123.		Removing fan from trailer
124.		Placing fan on base anchor bolts
125.		Fan on new base-enclosed by fence
126.		Fan on new base-enclosed by fence
127.	Jennison Mine-Shannon Property	Site prior to construction
128.		Site prior to construction
129.		Site prior to construction

130. Site prior to construction
131. Structure removal
132. Structure removal
133. Structure removal
134. Structure removal
135. Structure removal
136. Structure removal
137. Structure removal
138. Structure removal
139. Structure removal and debris cleanup
140. Structure removal and debris cleanup
141. Structure removal and debris cleanup
142. Structure removal and debris cleanup
143. Structure removal and debris cleanup
144. Structure removal and debris cleanup
145. Salvaging topsoil
146. Salvaging topsoil
147. Salvaging topsoil
148. Final grading and contouring
149. Final grading and contouring
150. Final grading and contouring
151. Final grading and contouring
152. Replacing topsoil
153. Replacing topsoil
154. Replacing topsoil
155. Replacing topsoil
156. Replacing topsoil
157. Replacing topsoil
158. Replacing topsoil
159. Replacing topsoil
160. Replacing topsoil
161. Applying vegetative mulch
162. Completed fertilizing, seeding and mulching
163. Completed fertilizing, seeding and mulching
164. Completed fertilizing, seeding and mulching

165.		Completed fertilizing, seeding and mulching
166.		Completed fertilizing, seeding and mulching
167.		Completed fertilizing, seeding and mulching
168.	Gardner Mine-Sullivan Property	Site prior to construction
169.		Access road to site
170.		Access road to site
171.		Salvaging owner-requested equipment
172.		Storage site for landowner's items
173.		Topsoil salvaging
174.		Topsoil salvaging
175.		Topsoil salvaging
176.		Topsoil salvaging
177.		Topsoil salvaging
178.		Subsidence backfill
179.		Subsidence backfill and/or grading
180.		Subsidence backfill and/or grading
181.		3' diameter airshaft
182.		3' diameter airshaft
183.		Filling airshaft w/gravel
184.		Filling airshaft w/gravel
185.		Filling airshaft w/gravel
186.		Replacing topsoil
187.		Replacing topsoil
188.		Replacing topsoil
189.		Topsoil replaced
190.		Applying fertilizer and seed
191.		Applying mulch
192.	Gardner Mine-Gardner Property	Subsidence backfill
193.		Waste pile removal
194.		Applying fertilizer and seed
195.	Jennison Mine-Explor Area #1 and #2	Construction signing-east end of Exploration Area #2
196.	Traffic control	Construction signing-east end of Exploration Area #2

197.		Construction signing-east end of Exploration Area #2
198.		Construction signing-east end of Exploration Area #2
199.		Construction signing-west end of Exploration Area #1
200.		Construction signing-west end of Exploration Area #1
201.		Construction signing-west end of Exploration Area #1
202.		Construction signing-west end of Exploration Area #1
203.		Construction signing-single lane traffic Exploration Area #2
204.		Construction signing-Exploration Area #2
205.		Construction signing-sign covering when not in use
206.		Construction signing-boreholes marked for traffic
207.		Construction flagging-stopping traffic
208.	Jennison Mine-Exploration Drilling	Exploration Area #1-B.H. #412
209.		Exploration Area #1-B.H. #418
210.		Exploration Area #1-B.H. #418
211.		Exploration Area #1
212.		Exploration Area #1-B.H. #402
213.		Exploration Area #2-B.H. #510
214.		Exploration Area #2-B.H. #510
215.		Exploration Area #2-B.H. #514
216.		Exploration Area #2-B.H. #523
217.		Exploration Area #2-B.H. #5
218.		Exploration Area #2-B.H. #529
219.		Exploration Area #2-B.H. #530
220.		Exploration Area #2-B.H. #610
221.		Exploration Area #3-B.H. staked completed boreholes
222.	Jennison Mine-Explor	Installing 3" injection pipe-steel
223.	Areas #1 and #2 Grouting	Installing 3" injection pipe-steel
224.		Installing 3" injection pipe-steel
225.		Installing 3" injection pipe-steel
226.		Water injecting through injection pipe
227.		Water injecting through injection pipe
228.		Water injecting through injection pipe
229.		Injection pipe with "packer"

230.		Pressure grout injection setup
231.		Pressure grout injection setup
232.		Pressure grout injection setup
233.		Pressure grout injection setup
234.		Pressure grout injection-gauge at 70 psig
235.		Truck unloading into grout pump
236.		Truck unloading into grout pump
237.		Truck unloading into grout pump
238.		Pressure grouting
239.		Pressure grouting
240.		Pressure grouting
241.		Pressure grouting
242.		Removing injection setup and piping- grout flowing out of borehole
243.		Removing injection setup
244.		Removing injection setup-pipe full of grout
245.		Removing injection setup
246.		Gravity grouting boreholes
247.		Gravity grouting boreholes
248.		Gravity grouting boreholes
249.		Gravity grouting boreholes
250.		Gravity grouting boreholes
251.		Reclaiming access ramps after grouting
252.	Equipment	Pickup truck - Ford 4x4
253.		Water truck-International w/3000 gallon tank
254.		Drilling rig-Gardner-Denver air-rotary
255.		Trailer with grout injection pipe
256.		Pickup truck - Ford
257.		Dump truck - Ford
258.		Front-end loader - Waldon
259.		Front-end loader - Caterpillar 966
260.		Dozer - Caterpillar D8H
261.		Lowboy trailer w/D8H dozer
262.		Compressor-Sullair
263.		Crane - P&H

- 264. Crawler tractor - D2
- 265. Crimping disc - Bowie
- 266. Grass drill - John Deere
- 267. Mulch spreader - home built
- 268. Tractor - Oliver w/disc
- 269. Tractor - John Deere w/drill
- 270. Grout pump - Case
- 271. Grout pump - Case
- 272. Backhoe - Case
- 273. Office trailer
- 274. Office trailer w/portable toilet

APPENDIX C

ANALYSIS OF PROFESSIONAL SERVICE FEES
 DATE OF PREPARATION: August 10, 1987
 PROJECT: Fairview Phase 4

PROFESSIONAL SERVICE	AMOUNT

* Data Gathering, Site Evaluation, Preliminary Engineering, Final Engineering, Bidding Documents	\$30,256.00
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* Construction Administration, Construction Inspection, Final Report Preparation	\$28,163.12
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L.C. HANSON CO. COSTS	----- \$58,419.12 -----
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CONSTRUCTION COSTS	----- \$277,347.69 -----
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PERCENTAGE ANALYSIS

PRE-CONST. LCH CO COST/CONSTRUCTION COST	10.91%
CONST. & POST CONST. LCH CO. COST/CONSTRUCTION COST	10.15%
TOTAL LCH CO. COST/CONSTRUCTION COST	21.06%

REMARKS: Services provided include lien determination, landowner consent, budget preparation, grant application, weed board approval, basic engineering, construction staking, contract administration, quantity accounting and full time resident inspection. The project included surface reclamation work at four mines as well as subsurface reclamation work under a state highway and the lower Yellowstone Irrigation District canal. Nine landowners were involved with the project. The cost of the underground work increased 42% over the original estimate to meet all site conditions encountered. This necessitated a change order for construction.
